

2.2 Volumes of Solids

We often take basic geometric formulas for granted. (Have you ever asked yourself why the volume of a right cylinder is $V = \pi r^2 h$?) In this subunit, we will explore how some of these formulas were developed. The key lies in viewing solids as functions that revolve around certain lines. Consider, for example, a constant, horizontal line, and then imagine that line revolving around the x-axis (or any parallel line). The resulting shape is a right cylinder. We can find the volume of this figure by looking at infinitesimally thin “slices” and adding them all together. This concept enables us to calculate the volume of some extremely complex figures. In this subunit, we will learn how to do this in general; in the next, we will now take a look at two conventional methods for doing so when the figure has rotational symmetry.